questions affecting the welfare of the nation, and who love the life of nature without standing apart from the more strenuous current of human affairs.

The chapter on the North American forest contains an excellent résumé of distribution of forests before they were changed by the influence of man. It is shown that the forest is controlled by certain definite factors and that the struggle of the forest with the prairie and the bog is constant, as is also the struggle between the individual trees of the same forest; so that a correct understanding of the complex conditions which determine the distribution of trees becomes of utmost importance in silviculture.

The next chapter contains a brief history of the relation of the forest to the growth of the nation. It was absolutely necessary for the pioneer to clear the forest, and the damage his immediate successors have done by carrying this destruction too far must be repaired by the present generation. The author takes a very optimistic view of the future condition of the forests.

Forest finance and management, forestry and government, protecting forests from fires and thieves, and forestry and taxation are so treated as to show that the author is well informed on these phases of the forestry problem. In chapters on reform in forestry methods, and forestry as a profession, a brief history of the reform is given and some mistakes are pointed out. Attention is called to the number of schools of forestry recently established, and to the practical results obtained by applying scientific methods to certain plots, which the Forestry Division of the U. S. Department of Agriculture is now encouraging owners to do.

The volume is not without literary merit; the author's style is clear and logical, and at times, as in the case of the description of a forest fire, fascinating. As the author well says, the question of forestry cannot be solved by sudden bursts of enthusiasm, and does not appeal to man's emotional nature. Sensible treatment of our forest wealth will come only through the education of the public along this line. The book deserves a wide reading because it will contribute to this end. — H. N. WHITFORD.

MINOR NOTICES.

IT IS a pleasure to receive a paper which possesses so many good qualities as the recension of the Mexican and Central American Umbelliferæ lately issued by Messrs. Coulter and Rose.[5] In examining this work one is impressed no less by its clear presentation of diagnostic and bibliographic essentials than by a judicious exclusion of irrelevant matter. The authors do not, for instance, attempt to give their work impressive proportions or an erudite appearance by adding under each genus and species all the synonymy which could have been cheaply compiled from the *Index Kewensis*

[5] COULTER, J. M. and ROSE, J. N.: A synopsis of Mexican and Central American Umbelliferæ. Proc. Wash. Acad. Sci. 1: 111–159. Jan. 1900.

If it seems best to give copious bibliography under one species, they do not feel it essential to cite for symmetry an equal amount of almost meaningless references under another.

The paper brings together in convenient form the results of considerable scattered activity, and the extent of recent work upon the group may be inferred from some introductory statistics. In 1880 Mr. Hemsley enumerated in the *Biologia Centrali-Americani* 25 genera and 76 species of Umbelliferæ. Messrs. Coulter and Rose — who, to the territory covered by Hemsley's work, add Lower California — recognize 39 genera and 182 species, including about 40 which are here described for the first time. It is interesting to note that this considerable increase in known species is about proportionate to the similar additions in the gamopetalous Mexican genera, which have been recently revised. It testifies not merely to the unforeseen wealth of the Mexican flora but also to the success of the many skilled collectors who, during the last two decades, have explored its vegetation with such diligence. Among these may be mentioned especially Messrs. Pringle, Palmer, J. D. Smith, Brandegee, Altamirano, Millspaugh & Gaumer, Nelson & Goldman, Rose, Hartman & Lloyd, L. C. Smith, Conzatti & González, C. L. Smith, Dugès, and Lamb.

The Umbelliferæ form a very natural group in which floral structure is remarkably constant. In their paucity of floral characters they may be compared to the Cruciferæ and, like them, have for the most part good species, comparatively few varieties, and (*exceptis neglectis*) technical rather than convincingly natural genera. It is a group, in fact, where numberless generic changes could be easily and plausibly initiated by anyone with a conscious or unconscious *penchant* for disagreement with his predecessors. The work of the present authors, however, is distinctly constructive rather than revolutionary.

In a paper where many names are cited a few slips are well-nigh inevitable; thus in the present instance *Seeman*, *Couthony*, and *A. L. Smith* have an unfamiliar look. The many specific names, which the authors have been obliged to coin, are mostly the simple and familiar descriptive terms of the *glauca*, *serrata*, and *rigida* type, with no such unscholarly linguistic jumbles as *pseudoparviflora*, *heterappendiculata*, *Saxifragopsis*, *parvicarpum*, etc., which have of late so frequently marred the publications from other American botanical establishments, although rarely found in the writings of our more classical transatlantic colleagues. Another point which merits special mention is the scrupulous care with which the authors have avoided the publication of manuscript or herbarium names in their synonymy — a useless practice which, notwithstanding the emphatic protest of Mr. B. Daydon Jackson and others, is still too prevalent.

The revision is illustrated by ten excellent plates and numerous text cuts. — B. L. ROBINSON.

PROFESSOR F. LAMSON-SCRIBNER has published the second part of his *American Grasses* as Bulletin 17 of the Division of Agrostology. It will be remembered that every species is illustrated. Part I contained illustrations of 302 species, and Part II adds 325. The interesting statement is made that of the 627 species now illustrated, "19 may be regarded as characteristic of the Atlantic coast region, 83 of the region of the Gulf of Mexico, 92 of the southwest, including the states of Texas, New Mexico, Arizona, and southern California, 74 of the states of California, Oregon, and Washington, and 61 of the Rocky mountain region, of which 19 may be regarded as more properly the prairie species of that region." This series will certainly prove very useful in the identification of grasses, a family usually left to the expert.

Bulletin 21 of the same division contains a revision of the North American species of *Chætochloa*, by F. Lamson-Scribner and Elmer D. Merrill. In our older manuals the name was *Setaria*, and the three or four introduced species are very familiar. The name Setaria being untenable, the plants were called *Chamæraphis* Kuntze, not R. Br., and then *Ixophorus* Nash, not Schlecht, and now *Chætochloa* Scribner. In North America there are twenty-eight species of the genus, six of them being described as new in this bulletin. There are twenty-three natives, and of the five introduced European species three are cosmopolitan weeds.— J. M. C.

THE two previous fascicles of the *Flora of the West Indies*[6] have already been noticed in this journal. The third fascicle, just published, completes the first volume, making a book of 536 pages, and contains the following papers; Botanical bibliography of the West Indies, by Urban; Araliaceæ, by Urban; Polygonaceæ, by Lindau; Asclepiadaceæ, by Schlechter; new species, especially Porto Rican, by Urban; Eriocaulaceæ, by Ruhland; Juncaceæ, by Buchenau; and Sabiaceæ, by Urban. Some conception of the unworked condition of the West Indian flora may be gained from the fact that Urban's paper on the new species (especially Porto Rican) occupies over 190 pages. *Syngonanthus* is a new genus of Eriocaulaceæ, containing three species formerly referred to Pæpalanthus.

The first fascicle of the second volume contains a supplementary paper (7 pp.) by Urban upon the botanical bibliography of the West Indies, twenty-seven titles being added. The rest of the fascicle (153 pp.) contains the Cyperaceæ, by C. B. Clarke, twenty-four of the twenty-six genera being presented. The large genera are Rhynchospora (56 spp.), Scleria (30 spp.), Cyperus (27 spp.), Eleocharis (27 spp.), and Mariscus (21 spp.), the great genus Carex being represented by only six species.— J. M. C.

[6] URBAN, IGNATIUS: Symbolæ Antillanæ seu fundamenta floræ Indiæ occidentalis. Vol. I. fasc. III, pp. 385–536; Vol. II. fasc. I. pp. 1–160. Berlin: Gebrüder Borntræger. 1900.

A NOTABLE PAPER in the forthcoming 19th annual report of the U. S. Geological Survey is that by Professor Lester F. Ward upon "The Cretaceous formation of the Black Hills as indicated by the fossil plants," with the collaboration of Walter P. Jenney, Wm. M. Fontaine, and F. H. Knowlton. The paper contains 192 pages of text and 116 plates, those illustrating the species of Cycadeoidea (101 in number) being fine half tones. The plants are considered under four heads: (1) fossil cycadean trunks, (2) fossil forests, (3) other Lower Cretaceous plants, and (4) plants from the Dakota group. The surprising development of cycads in the region of the Black Hills is the subject of special interest to botanists. In 1894 Professor Ward described the seven cycadean species then known from Maryland, but the present paper contains the descriptions of twenty-two species from the Black Hills. These American forms all belong to the genus Cycadeoidea (really identical with Bennettites), which is not now regarded as a true cycad, but as forming a distinct gymnosperm group, Bennettitales, coordinate with Cycadales, etc. The whole paper is full of material for the botanist interested in the history or phylogeny of plant groups.— J. M. C.

FOLLOWING the discovery of the numerous gigantic species of Cycadeoidea (Bennettitales) from the Cretaceous of the Black Hills, described by Professor Ward in the 19th annual report of the U. S. Geological Survey, there comes an account of a rich discovery of cycads in the Jurassic of Wyoming (Carbon county). The forms are small and bulbous, and are thought by Professor Ward to constitute a new genus, which he calls *Cycadella*, and under which he describes no less than twenty species. The great feature of the genus seems to be a peculiar outer covering which completely invests and cuts off from view the usual cycadean armor. The statement is that "Cycadella developed an exuberant growth of fine scales or hairs from the bases of its old petioles below the apex, which formed a woolly or mossy covering of considerable thickness, sufficient when tightly appressed to the trunk and petrified there to form a layer 5–15^{mm} thick all over the fossil trunks." The paper appears in Proc. Washington Acad. Sci. 1: 253–300. 1900, and is illustrated by eight half tone plates.— J. M. C.

ALMOST a century ago (1806–1813) Sibthorp and Smith published their *Floræ Graecæ Prodromus*, and in his *Flora Orientalis* Boissier made such additions as exploration of certain minor regions made necessary. In fact, our knowledge of the Grecian flora has been very incomplete. To supply this lack Wilhelm Engelmann has undertaken the publication of a complete flora of Greece by Dr. E. de Halácsy,[7] than whom no one is more competent, as he possesses abundant material, has traversed the country a number of

[7] HALÁCSY, E. DE: Conspectus Floræ Graecæ. Vol. 1. Fasc. 1. pp. 1–224. Leipzig: Wilhelm Engelmann. 1900. *M* 5.

times, and has already published a number of memoirs upon the subject. The *Conspectus* will be entirely in Latin, and will enumerate with full description, synonymy, and habitat, all the plants of political Greece, with its isles, and also of Epirus and Crete. The work will appear in eight to ten fascicles, each containing about 160 pages, and will be completed in five or six years. The cost of the whole work will not exceed 30 marks, or 38 francs. The preface, bibliography, and keys will appear with the last fascicle. The first one includes Ranunculaceæ to Alsinaceæ, and the sequence is that of Bentham and Hooker.—J. M. C.

THE LAST "Contribution from the Gray Herbarium of Harvard University" appears as *Proc. Am. Acad.* 35:307–342. 1900, and contains four papers. The first is by J. M. GREENMAN, entitled "New species and varieties of Mexican plants," and contains descriptions of twelve new species.— The second is by B. L. ROBINSON, entitled "Synopsis of the genera Jaegeria and Russelia." The species of Jaegeria have been much confused with Sabazia, Galinsoga, Melampodium, and Spilanthes. Dr. Robinson recognizes nine species, two of which are new. The genus Russelia contains thirteen species, two of which are new.— The third paper is by E. B. ULINE, entitled "New Dioscoreas from Mexico," and contains descriptions of two species and a new variety.— The fourth paper is by B. L. ROBINSON, entitled "New phanerogams, chiefly Gamopetalae, from Mexico and Central America," and deals chiefly with new species (twenty in number) and specific reductions in the genus *Eupatorium*.— J. M. C.

THE fourth fascicle of Engler's work on the genera and families of African plants[8] has just appeared, completing the Combretaceæ. Notices of the preceding fascicles appeared in the BOTANICAL GAZETTE for January 1899 and January 1900. In the third fascicle a synopsis of Combretaceæ and an elaboration of the greatest genus, *Combretum*, were given. In the present fascicle the nine other African genera are presented, by far the largest being *Terminalia*, with 45 species, 22 of which are described as new. The fascicle is a model of completeness and fine presentation, the plates and figures being especially worthy of commendation. The general conclusions in reference to the African Combretaceæ, apart from those littoral species which belong to the mangrove-formation, is that there is very little relation with either tropical America or Madagascar, but that there is a rich development of endemic groups in the various plant-formations of tropical Africa.— J. M. C.

JANET R. PERKINS has published a "Monograph of the genus Mollinedia," being a dissertation for the doctorate at the University of Heidelberg.

[8] ENGLER, A.: Monographien afrikanischer Pflanzen-familien und -Gattungen. IV. Combretaceæ excl. Combretum, bearbeitet von A. Engler and L. Diels. 4to. pp. 44. *pls.* 15. *figs.* 5. Leipzig: Wm. Engelmann. *M* 12.

The genus belongs to the Monimiaceæ, and is peculiar to tropical America, with its greatest development in southern Brazil. In 1868, in his monograph of the genus for the *Prodromus*, A. DeCandolle recognized 28 species, two of them being regarded as doubtful. In the present monograph 71 species are presented, 46 of them being described for the first time.— J. M. C.

A REVISION of the North American species of *Euphorbia* § *Tithymalus* has been published by J. B. S. NORTON in the 11th annual report of the Missouri Botanical Garden, illustrated by 42 plates. Thirty-six species are recognized, eight of them introduced from Europe, and one of them new. The section contains about 400 species of the 700 or more that have been described, but is rather poorly represented in America, the greater number being southwestern and xerophytic.— J. M. C.

NOTES FOR STUDENTS.

MR. FRANCIS E. LLOYD is making a vigorous study of the comparative embryology of the Rubiaceæ. His first paper[9] outlines the task before him and discusses the development of *Vaillantia hispida*, one of the Galieæ indigenous to the Mediterranean region, from earliest stages to mature fruit, paying special attention throughout to the matter of nutrition. The chief characteristics of this species are: a multicellular archesporium; a single integument; migration of the megaspore mother cell and development in the micropyle; great development of antipodals for the sake of securing food to the growing embryo-sac, and the development of a suspensor with cells clustered like a "bunch of grapes," which breaks down with the appearance of the cotyledons. There is found an abundant source of food supply and an efficient means of transmitting it during every stage of development, until finally the plant by way of the vascular region deposits a supply of starch and cellulose in the tissues surrounding the mature embryo.—J. E. WEBB.

BARANETZKY, to whom we owe an improved form of the registering auxanometer, describes[10] a new apparatus for recording the periodic curvatures of leaves and stems. The registering apparatus itself consists of a drum, carrying smoked paper, and rotated by clockwork once in twenty four hours. The writing point, a bit of flexible metal, is attached to a vertical belt, longer than the drum, passing over pulleys actuated in opposite directions by one or the other of two electromagnets on the base. The leaf stalk or stem to be studied is fastened to a swinging lever which actuates a train of three wheels by which the movements are magnified. The third axle carries a spur wheel, which, by bending aside a flexible platinum strip,

[9] LLOYD, F. E.: The comparative embryology of the Rubiaceæ. Bull. Torr. Bot. Club 8: 1–25. *pl. 1–3*. 1899.

[10] Berichte d. deutsch. bot. Gesells. 17: 190. 1899.